

**Walter Reed Army Medical Center
Uses RCA Compatible Color Television
For Medical Education**

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**WALTER REED ARMY MEDICAL CENTER
USES RCA COMPATIBLE COLOR TV SYSTEM
FOR MEDICAL EDUCATION**



Three-Channel System With Seven Color Cameras, Color Film System and Three Studios, Provides for 150 Training and Demonstration Programs Per Month as Tests Prove it Upgrades Quality and Cuts Costs of Medical Instruction

FIG. 1. (Left) Shows use of RCA medical color TV surgical camera which is installed in ceiling and is always focused on operating field without distracting or disturbing the operating team. No personnel are required in the operating room for the TV camera since the camera is remotely operated from a control room in the basement.

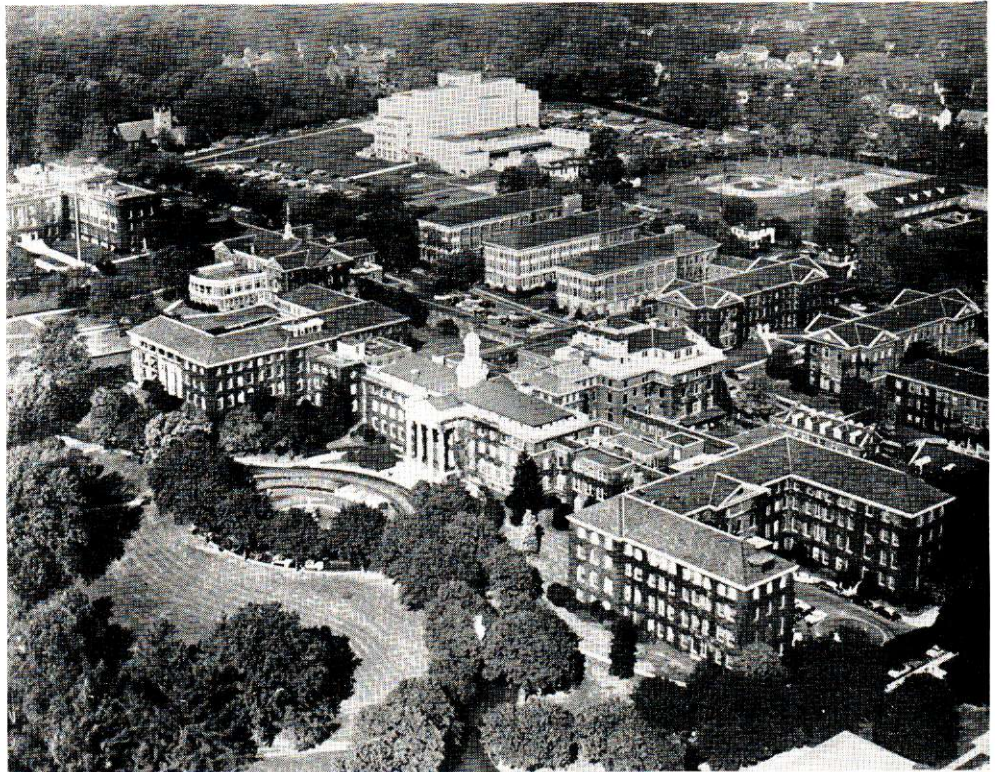


FIG. 2. Walter Reed Army Medical Center, Washington, D. C. Here are located the Walter Reed Army Hospital, the Walter Reed Army Institute of Research, and the Armed Forces Institute of Pathology. There are three separate color TV systems installed for educational applications.

Television at the Walter Reed Army Medical Center has for several years been an increasing force in training and education programs. The educational possibilities were found to have such substantial value that new and more extensive facilities have recently been installed. The original field sequential system has been replaced and expanded with compatible color TV equipment. Three interconnected TV centers have been established. The system is unique in that it employs the first color TV equipments designed specifically for medical instruction and demonstration purposes.

Experience with the color TV system originally installed at the Center has convinced the Army Medical Service that television can be an effective and potent force in training and education programs. The TV system lets unlimited numbers of students peer closely over the surgeon's shoulder, or view a microscopic field with the instructor. There need be no remote, back-row seats at televised demonstrations. Instructors have found that TV has an almost hypnotic ability to focus the students' attention, hence teaching results as good as direct instruction to small groups are possible.

The Walter Reed system is unique in that it contains the first Medical Color TV Camera designed for ceiling mounting in

operating and autopsy rooms. It also includes a specially designed color TV system of microscopy utilizing standard instruments. In the film area, $3\frac{3}{4} \times 4$ -inch slides, as well as 2×2 -inch slides and motion pictures, can be accommodated. Finally, for projection to large groups, several newly developed color TV picture projectors are installed.

For the medical profession, as well as educators and the military, this installation is ideal for exhibiting the educational potential of television, since the Center conducts an unusual variety of medical-scientific activities. Here are the functions of a large general hospital. Here is the Walter Reed Army Institute of Research, which spearheads the Army's medical, dental, and veterinary research and graduate education projects. Here is the Army Prosthetics Research Laboratory, recognized for development of prosthetic devices for the amputee. The Central Dental Laboratory has here an extensive teaching mission. The latest establishment to locate at Walter Reed is the Armed Forces Institute of Pathology (AFIP), which is the central laboratory of pathology for the Army, Navy, Air Force, Veterans Administration, Public Health Service and other agencies.

The television activity at Walter Reed was found to have substantial value in

supporting scheduled courses. Therefore, as early as 1954, the whole question as to where emphasis should be placed in relation to television was brought under discussion. It was decided that the television needs of the Army Medical Service would be fulfilled by a closed-circuit compatible color television system.

Bids for such a system were requested and, in June 1955, a contract was awarded to Radio Corporation of America. This provided for a television system to serve the requirements of the three major organizations at Walter Reed Army Medical Center—the Walter Reed Army Hospital, the Walter Reed Army Institute of Research, and the Armed Forces Institute of Pathology (AFIP).

Initial delivery of equipment began in the late summer of 1955, and installation of the new system was undertaken early in the fall of 1955. The installation was completed late in 1956, and initial programming began before year's end.

Three Studio Areas

The TV activity is the responsibility of a newly created Television Division of the Center. Headquarters' offices of this Division are located in the AFIP building. Here, too, is the main production studio, this being a substantial and well-equipped area in which as many as five general production sets can be used simultaneously.

FIG. 3. Master control at AFIP. Programs from all three buildings are received and distributed from here. Window at left overlooks main studio.



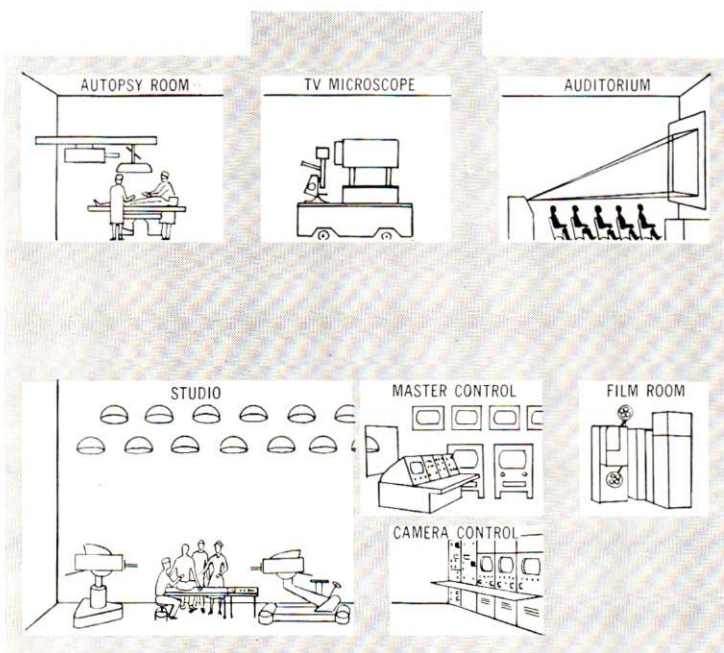
A smaller studio is located in the Institute of Research. This studio will allow as many as three sets to be used simultaneously and provides floor space for two-camera operation. A smaller studio area has been arranged in the Hospital. It will be used for patients too ill to be moved to the main studio.

Control Rooms and MC

At each of the studio locations there is a control room and an announcement booth. Control rooms associated with the studios at the Hospital and at the Institute of Research are relatively small. However, that located at the AFIP is of substantial proportions and quite adequate to meet the requirements not only for programs originating locally in the AFIP but also for master control of the entire system.

Although each of the three studios can simultaneously originate separate programming, the system has been so engineered that from the master control room in AFIP it is possible to use for a single major program all of the television equipment located at the Center. Thus, it is possible to consider the facilities at the Hospital and at the Institute of Research as similar

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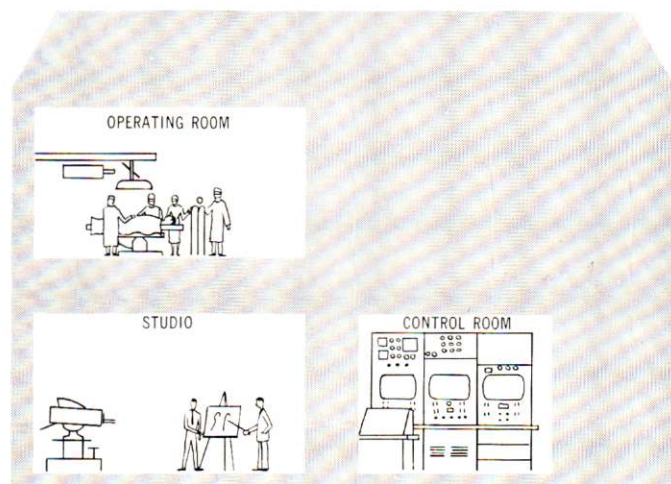


FIG. 4. These drawings show the three independent Color TV systems in the Walter Reed Army Medical Center—

to studios B and C in a single large television establishment. In addition to the potential for originating three separate simultaneous programs or a single complex program, it is also possible to feed into the local system programs originating from outside sources.

Compatible Color Equipment

At this point it perhaps would be well to comment specifically on the point of compatibility. This means, for instance, in connection with reception of programs from outside sources that be they in either black and white or color, it is possible for them to be displayed within the Center's own system exactly as they are received from outside. Indeed, the color programs of outside origin can, when desired, be viewed in either color or black and white. Similarly, programs originating here within the Center's system, though they are initially developed in color, may be viewed either in color or black and white. In addition they can be transmitted to outside users there to be displayed either over closed circuits or as broadcast transmissions, to be viewed in color (if color receivers are available) or in black and white.

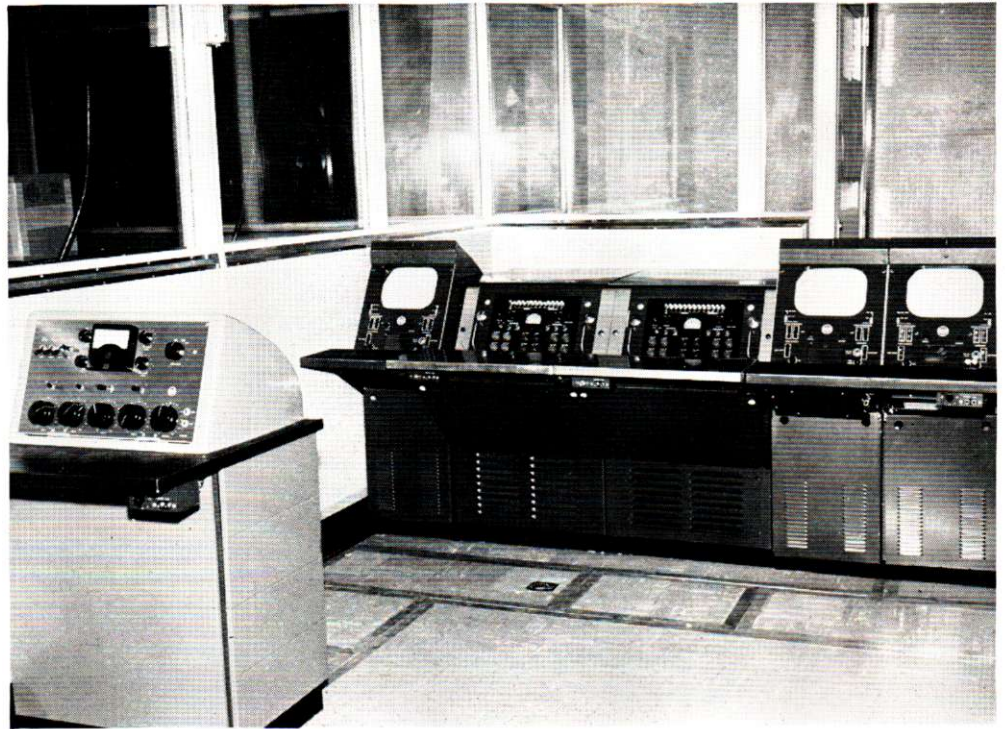
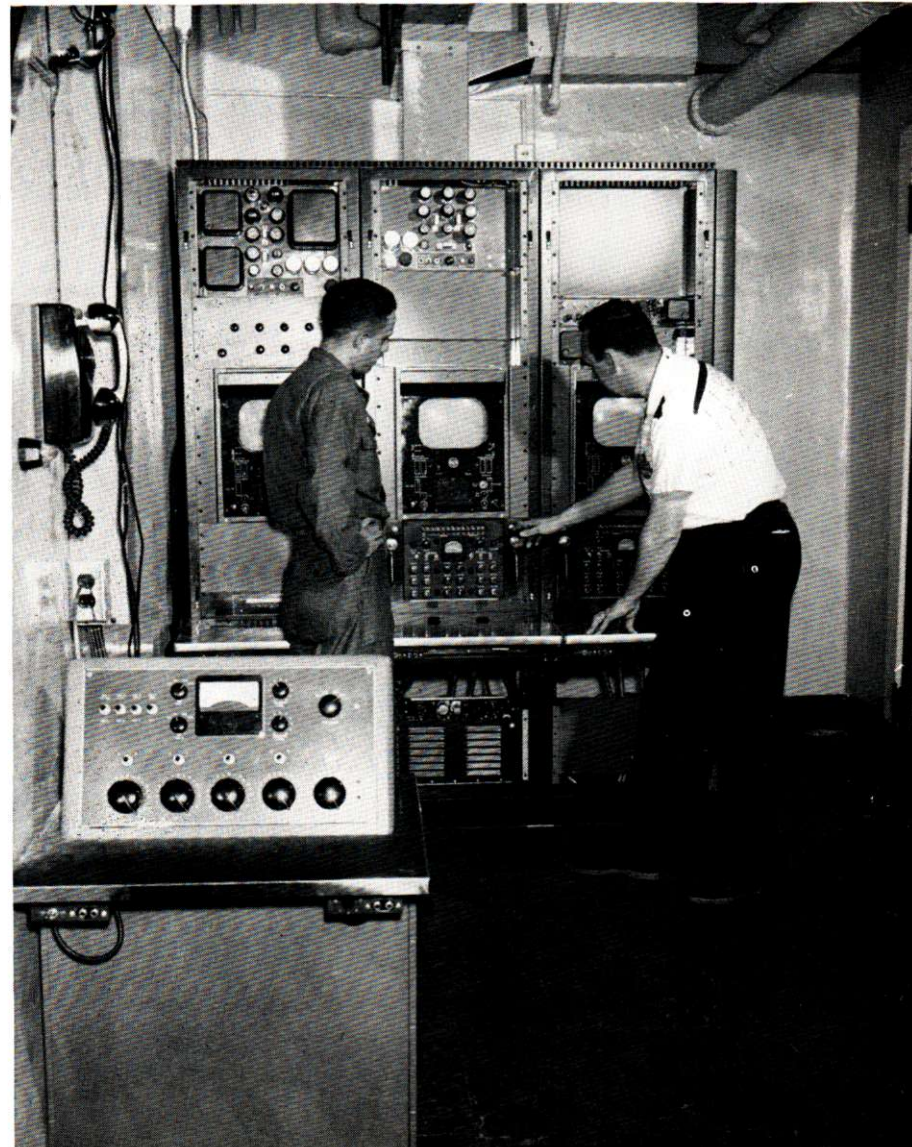
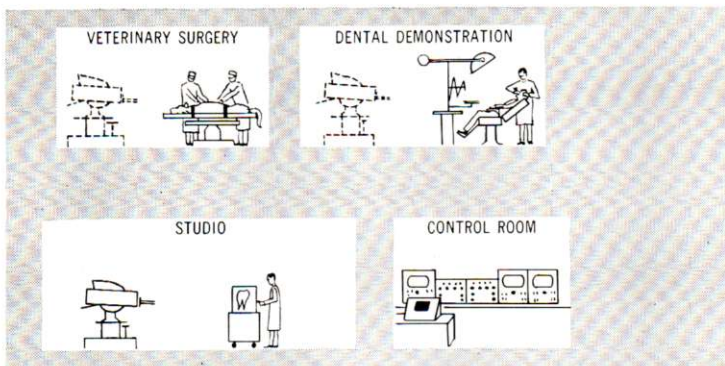


FIG. 5. Control room in the Institute of Research. Audio control in foreground, video in background. Two TV cameras are controlled here. A studio, at the left, is used for teaching demonstrations.

FIG. 6. Control room in the Army Hospital. The surgical TV camera in operating suite is controlled here. An adjoining studio is used for clinical demonstrations.



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and the facilities available in each building.

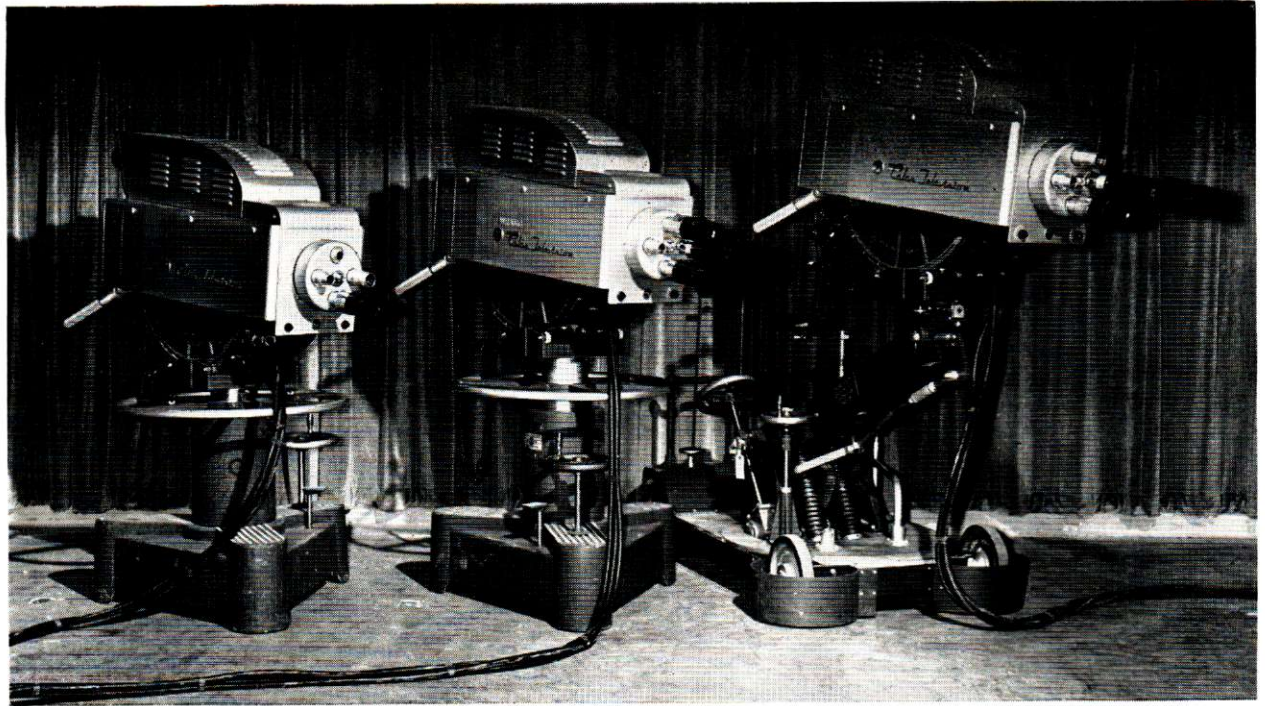


FIG. 7. Facilities in the main studio at AFIP include these three 1A-41 Color TV Cameras.

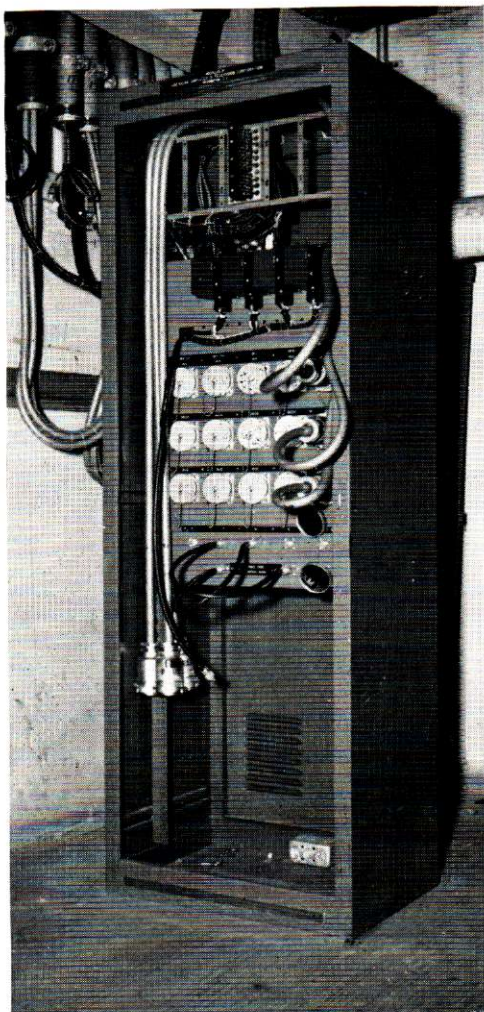


FIG. 8. Camera patch panel in Army Hospital is used to connect TV cameras in operating suite with control room.

Live Color Studio Cameras

Now for the specific distribution of equipment and identification of its functions: To support the requirement for studio operations, four image-orthicon camera chains have been procured. Currently two of these chains are based in the AFIP studio and one in each of the other two studios, at the Institute of Research and at the Hospital. Obviously, as program requirements fluctuate these cameras will be floated from one point to another in support of specific increased demands in any one location.

Medical Color Cameras for O.R. and Autopsy

At the Hospital permanent camera cables have been installed in two operating rooms, to equip them for television originations. In one of these operating rooms a special overhead surgical TV camera assembly is installed. The RCA 3-Vidicon Medical Color Camera used in this connection is of special design, which permits completely remote operation of its electronic characteristics as well as of its mechanical and optical adjustments, such as selection and change of lens and focus of the optical system. The suspension, the light, and the camera are so designed that at all times the center point of view for the camera coincides with the center point of focus of the operating room light. Though only one camera of this sort will be permanently installed in the operating room,

sufficient cabling exists for the use of an image-orthicon chain simultaneous with the use of the overhead camera.

Similarly at the Institute of Research, permanent camera cables have been installed in the veterinary surgery area, thus permitting television originations of animal surgery and of major animal demonstrations. A conference room also has camera cables installed so that important meetings may be documented via TV. Cables also have been placed into the dental demonstration area on the second floor, and although permanent cables have not been installed in Sternberg Auditorium on the first floor, the proximity of this room to the television studio immediately underneath makes possible the origination of programs from the auditorium with normal camera cable lengths directly to the control room below.

At the autopsy suite in the Institute of Pathology a TV surgical camera, similar to that in the Hospital, is being installed in the ceiling. In addition, cables are available for the simultaneous use of an image-orthicon chain from the floor. The lighting requirements peculiar to autopsy have necessitated a somewhat different light and camera suspension mechanism from that used in the operating room, however, essentially the same functions are involved. Camera cables have also been extended to the surgical pathology laboratory of the AFIP, to several of the teaching classrooms and to Dart Auditorium.

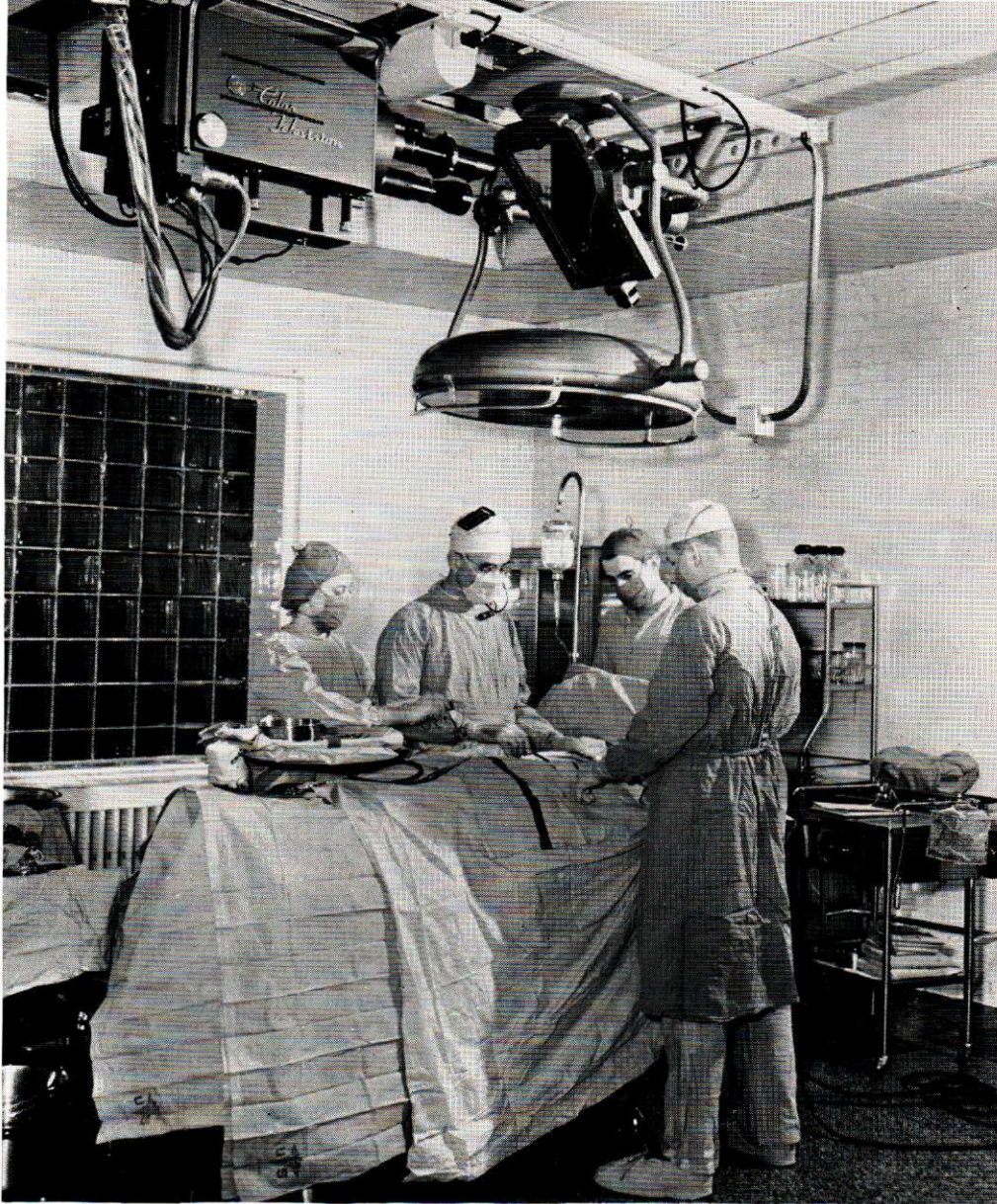


FIG. 9. Medical Color TV Camera is always focused on operating field by means of a mirror used in combination with a special ceiling light, which has a hole in center. Mirror movement and lens switching are remotely operated from the basement control room.

FIG. 10. Medical Color TV Camera is also used in autopsy suite to demonstrate post-mortem surgical procedures. Camera is remotely controlled.

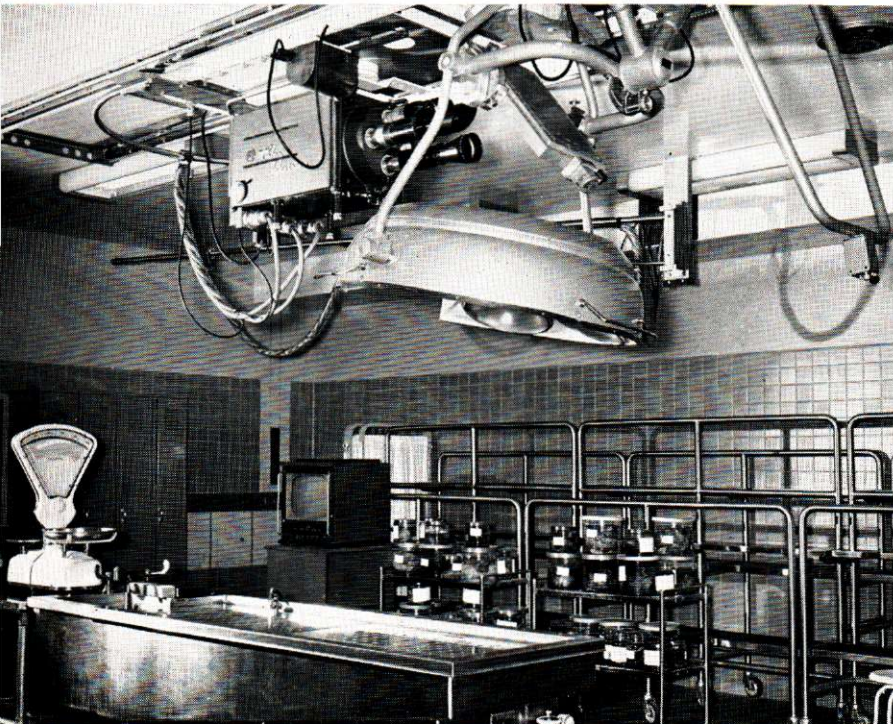
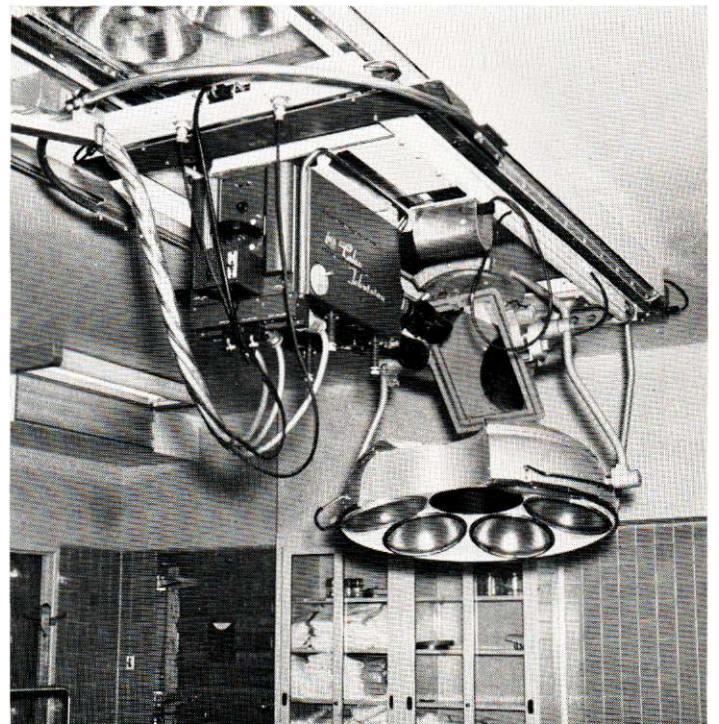


FIG. 11. Ceiling-mounted camera can be swung through full 360 degrees. Travel in north-south and east-west direction controlled by wall switches.

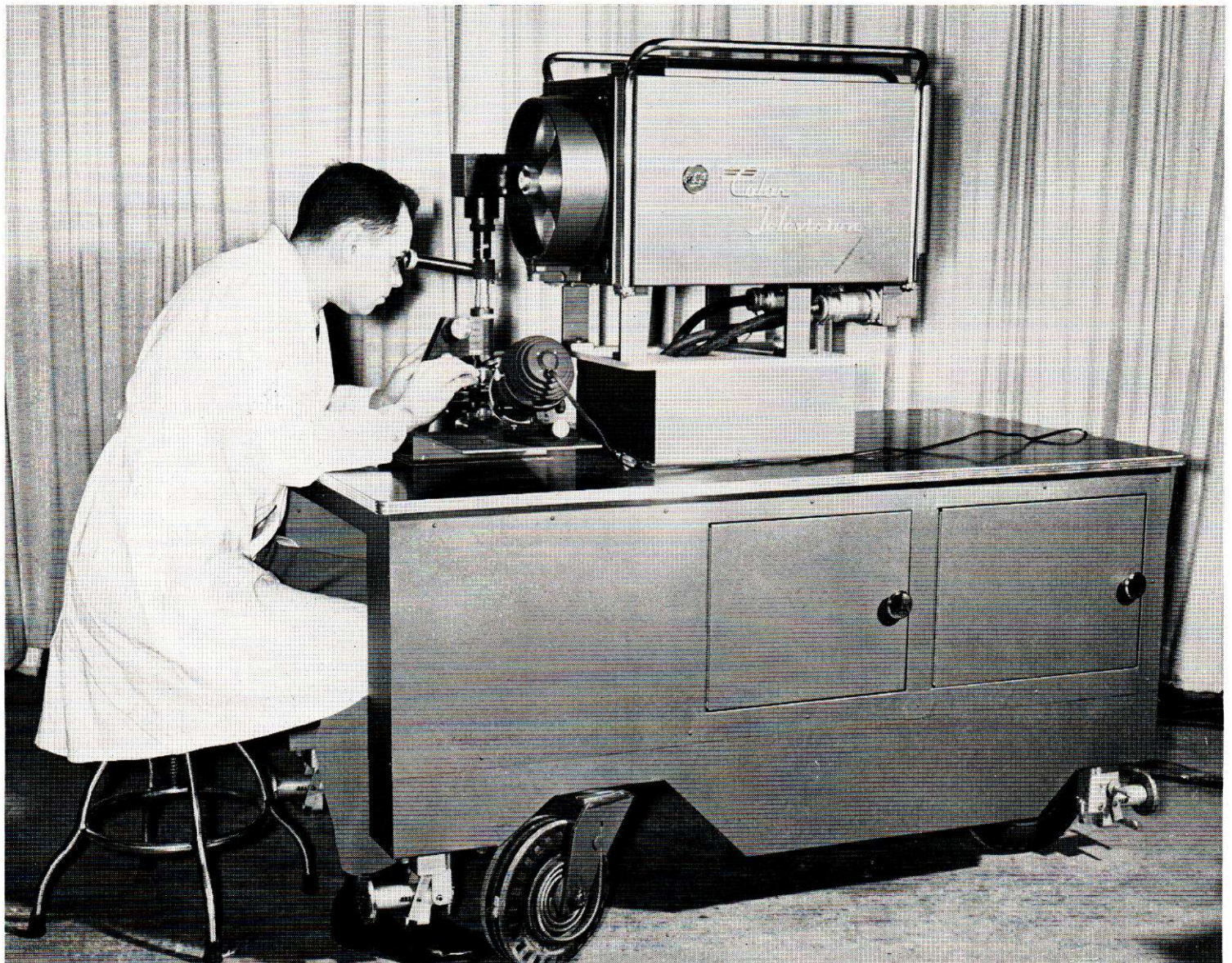


Color TV Microscopy

For use in color TV microscopy there has been developed a television microscope assembly. This utilizes an RCA 3-V color camera, similar to that installed in the operating room and in the autopsy suite. It is mounted on a microscope bench which was developed in the Biophysical Instrumentation Division of the Institute of Research. This bench has mounted on its surface a lathe bed, such as that used in a heavy-duty precision machine tool. On this bed are mounted keyed plates, adapted to fit the bases of several standard types of microscopes used for ordinary microscopy, for dark field microscopy and for phase contrast work. Illuminators of several types are similarly aligned optically, using the device of a keyed base operating on the lathe bed. The television camera itself is suspended in such fashion as to

insure alignment with the optical system of the several microscopes employed. The TV camera views essentially the same field as that displayed on the eyepiece of the microscope for use by the demonstrator. The whole of this assembly is mounted on heavy-duty, rubber-tired casters which allow it to be somewhat portable. In order to insure high quality, vibrationless operation, provision has been made for the unit to be suspended from retractable steel plates once it has been placed in a required area of operation. Thus, the television microscopy function can be quickly established in any one of the several locations where cables are available. It is envisaged that primarily it will function in the Surgical Pathology Laboratory, though undoubtedly it will also be used in the AFIP teaching classrooms, in Dart Auditorium, and occasionally in the AFIP studio.

FIG. 12. The Three-Vidicon Color TV Camera is used in conjunction with microscope to demonstrate microscopy before a group. Ordinary microscopy, phase contrast and dark field can be utilized.



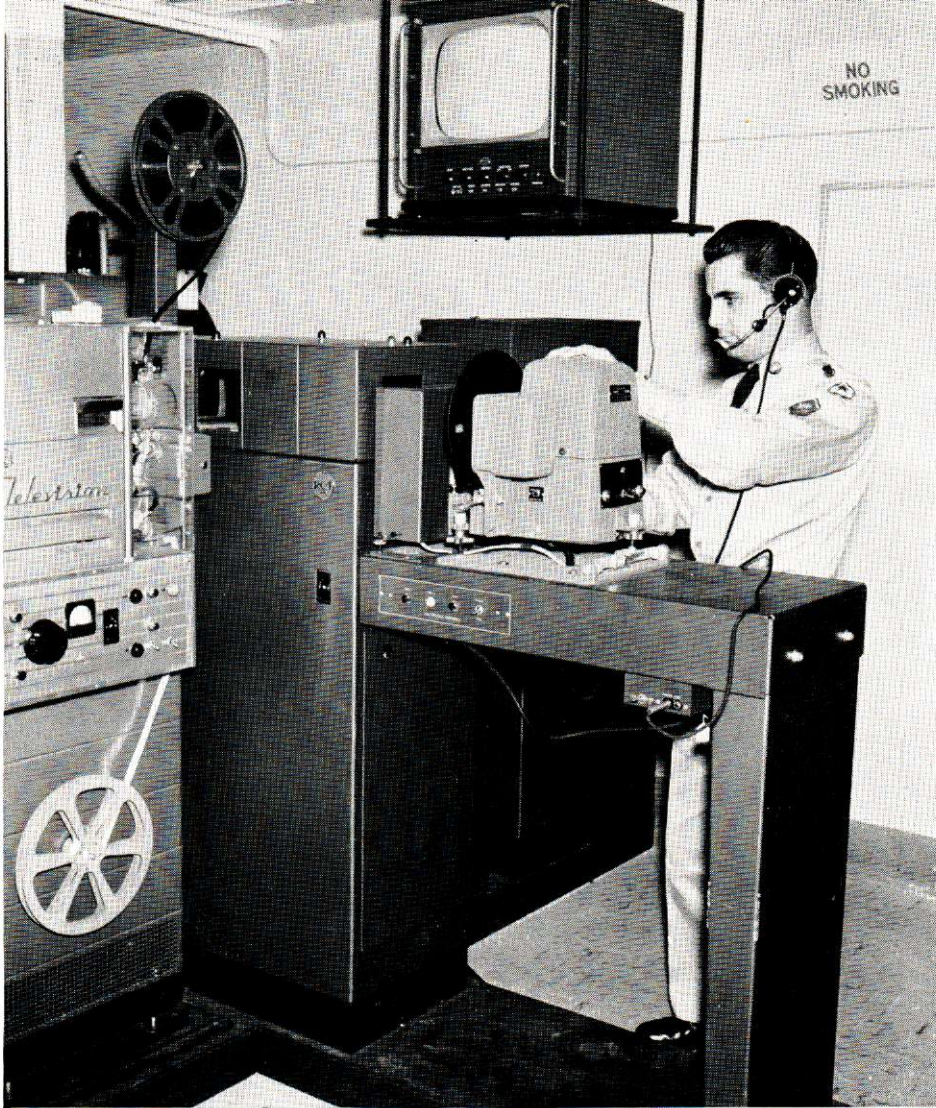


FIG. 13. Central film area in AFIP building serves the entire Walter Reed Army Medical Center. Operation can be controlled locally, or remotely from master control.

TV Film System

Another camera input, located in AFIP, is a film camera chain situated in an area adjoining the AFIP studio. Equipment consists of a TK-26 3-V color film camera, a TP-6 TV film projector, TP-3 dual-disc slide projector and a specially adapted B&L projector. Thus the unit will accept 16mm motion picture films, 2 x 2-inch slides, and 3 1/4 x 4-inch slides—color as well as black and white.

A point of interest in relation to the film camera chain is that it may be operated either locally or remotely. Remote operation is possible from any one of the three control room areas. This permits slide and motion picture film information to be integrated into programs originating in any one of the three primary locations of the TV Division's activities.

Other limited video inputs are available in the form of a monochrome flying spot scanner, and a monoscope. The flying spot scanner will be used essentially for superimposition of titles and identifications. This unit, incidentally, is located in the same room as the film camera chain. The monoscope is rack-mounted in the camera control room of the AFIP.

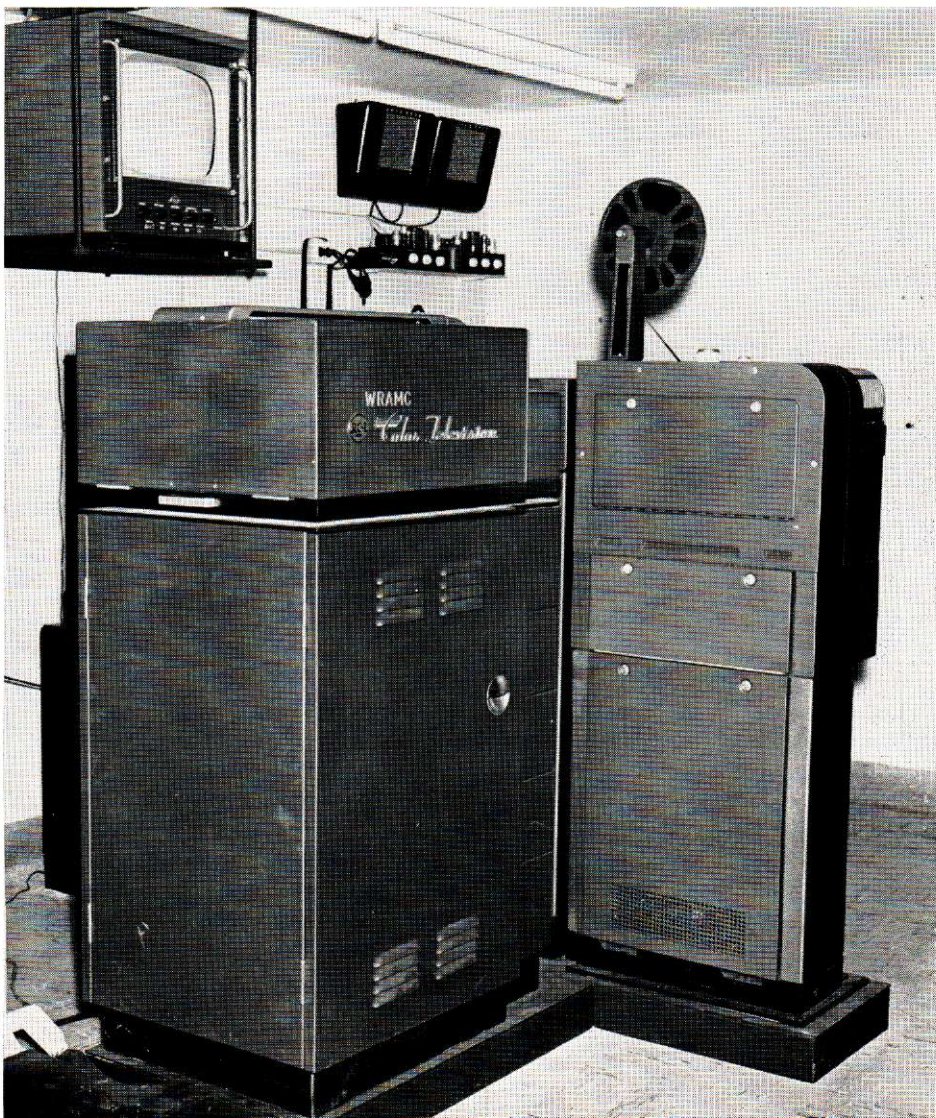


FIG. 14. The Three-Vidicon Color Film Camera is employed in film area in conjunction with 16mm motion-picture projector, 35mm and 3 1/4 x 4-inch slide projectors. Color as well as monochrome may be projected. These films and slides can be integrated into teaching demonstrations from any of the three buildings whenever needed.

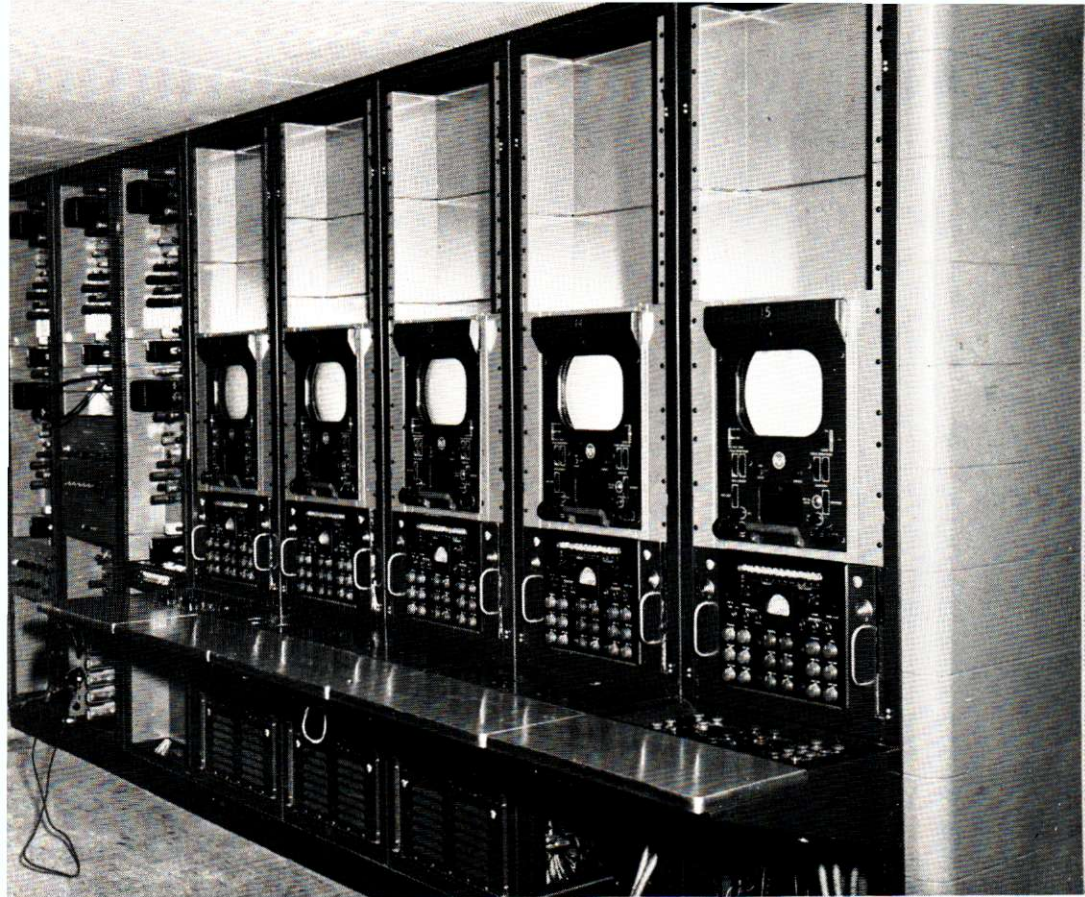
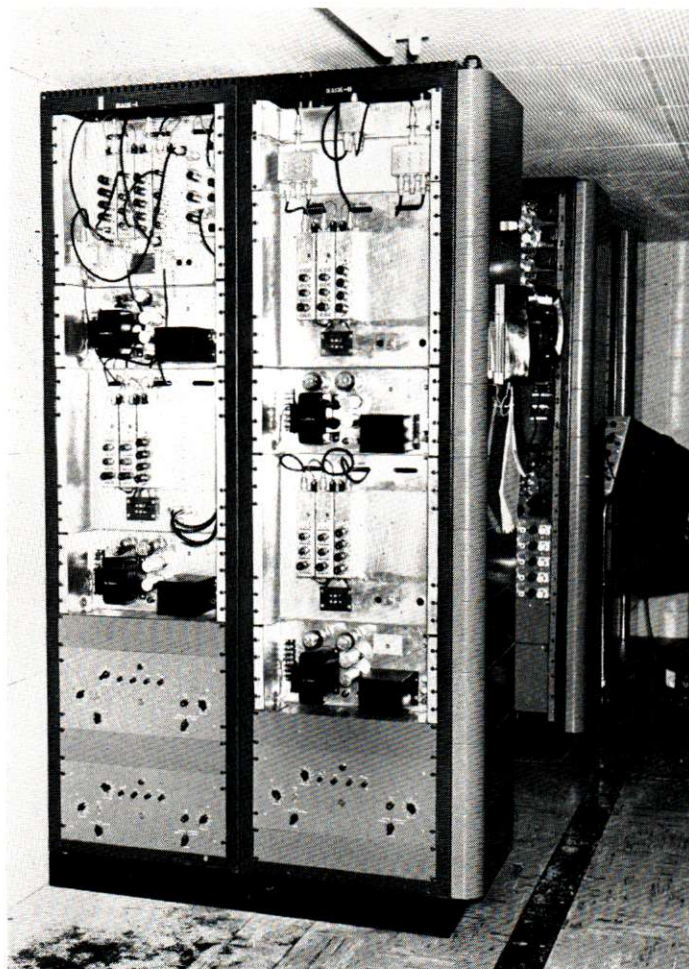


FIG. 15. Camera control room in AFIP building handles three studio cameras, the autopsy camera, and the film camera (also inputs from other areas to which studio cameras may be moved).

FIG. 16. Three-channel distribution system uses RCA Monitrans. This enables viewer to choose from three programs at any location.



Camera Control Room

In an area immediately adjoining the main studio is concentrated much of the rack-mounted gear used in conjunction with the television equipment located in the AFIP. For instance, in this room, which is separate from the master control room, are situated five color camera controls. These are used for the I.O. cameras in the studio, the input from the 3-V color film camera chain, and the 3-V input from the autopsy unit, as well as any other I.O. inputs which might be used in Dart Auditorium. In the camera room are also located colorplexers, rack-mounted test equipment, rack-mounted switching gear, and the control units for the Antena-plex distribution system and the three monitrans.

Three-Channel Distribution System

In addition to being able to originate three separate and simultaneous programs, these can be simultaneously distributed over cable on channels 2, 6 and 11. RCA monitrans are used for this purpose. One hundred twenty-eight video display areas are represented in the installed cable distribution network. These picture-viewing sites are located throughout almost all of the strategic areas of the Hospital, the Institute of Research, and the AFIP. Presently, sixty 21-inch RCA color receivers are being procured for location according to specific program requirements. In addition, there are two large-screen TLS-50 color TV projection systems, one for the Dart Auditorium of the AFIP and the other for Sternberg Auditorium at the Institute of Research. These units will project a brilliant high-quality image to a size of approximately 4 x 6 feet in color and 6 x 8 feet in black and white.

Kine Recording

Provisions have been made for recording video information from the three program lines. A monochrome kine-recorder utilizing 16 millimeter film has been received on loan from the Army Signal Corps, and it is intended that black and white 16 millimeter motion picture recordings will be made of essentially all information distributed. These films will be used for documentary purposes, but in addition will serve as an excellent basis for continuing program critiques, to upgrade constantly the standards of television performance.

Administration

The Television Division activity functions under the headquarters of the Walter Reed Army Medical Center, Major General Leonard H. Heaton, commanding. Policies are defined and guidance given through the medium of a Department of Army level television policy and guidance committee which includes in its membership the Surgeon General of the Army, the Chief Signal Officer of the Army, the Commanding Generals, Walter Reed Army Medical Center and Brooke Army Medical Center, and selected division chiefs of the several organizations.

Medical TV Programming

At the Post level, the TV Division is assisted in its programming functions by a local program advisory committee numbering in its membership representatives from each of the major interested agencies of the Post and representatives of the several major professional staffs. The local program advisory committee has been meeting regularly and has explored a widely ranging number of program areas. It is considered that from these explorations it will be possible first of all to identify present interest in educational television and simultaneously to stimulate increasing interest by those groups which to date have had little opportunity to explore the medium. This, together with already established courses of training and instruction, insures that there will be no paucity of program material to be developed after the initial program date. Presently, it is projected that during the remainder of fiscal year 1957, there will be a steady increase in both local and off-post program transmissions, these reaching a level of approximately 100 per month by the year's end.

The ultimate capacity of the Division is difficult to ascertain. However, it is expected that this point will be reached during fiscal year 1958, and that it is approximately 150 to 200 programs per month.

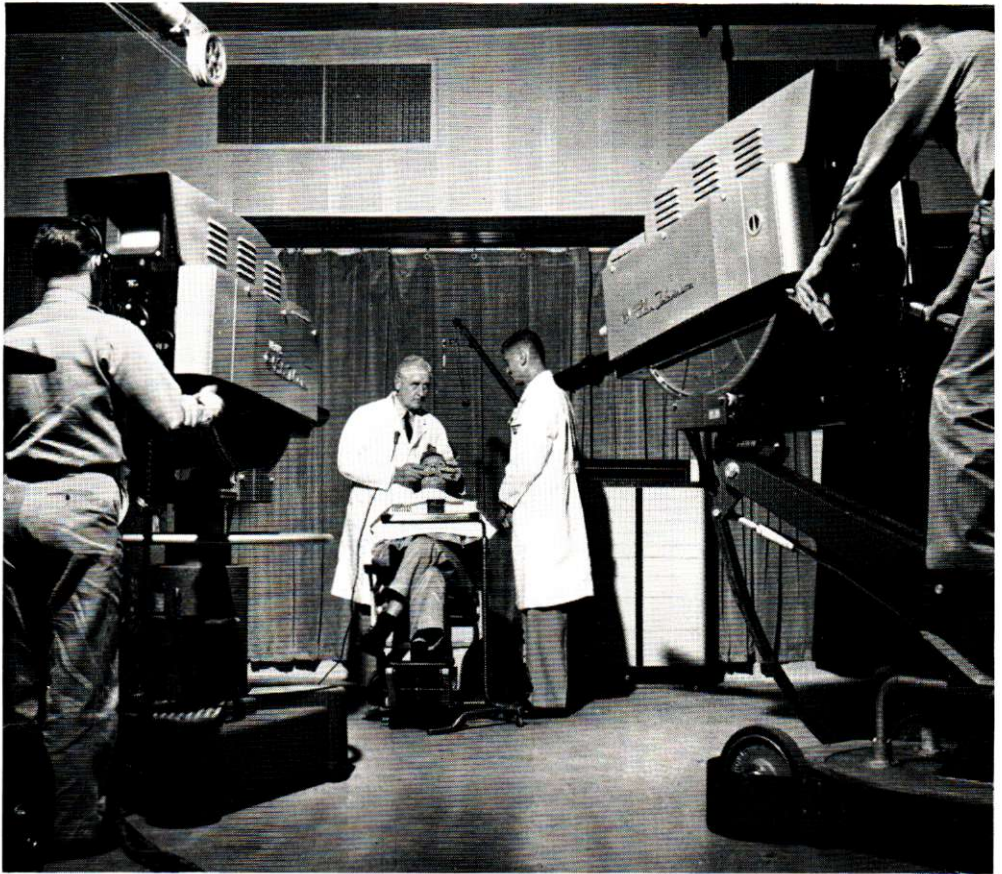


FIG. 17. Typical dental demonstration conducted in the main studio at AFIP building. This program can be distributed to viewing locations in all three buildings and can also be fed to outside networks for distribution to other cities for medical conventions.

FIG. 18. Typical clinical procedure being demonstrated in main studio as part of program to nurses and doctors in viewing classrooms. Professional equipment and techniques are employed.





FIG. 19. Professional production techniques are utilized in order to present teaching and training programs with as much impact as possible.

Personnel

Personnel required for satisfactory function of the television system is presently estimated at 47 people, approximately half being civilian and half military. Two-thirds are identified with technical operations responsibility, and one-third with program matters. For instance, in addition to the executive director of the division and his assistant, the program branch consists of a producer, a production co-ordinator, program directors, floor managers, an art director, a writer, a film editor and studio personnel. The technical branch is headed by a chief engineer and an assistant chief engineer, assisted by technical directors. The remaining engineering personnel may be identified as serving video operation and audio operation, maintenance functions, kine-recording and lighting functions. Higher echelons of maintenance on the television system are the responsibility of the Post Signal Officer, who has on his staff for this purpose ten individuals—two civilian and eight military. These persons are also available for technical operation functions in support of the Television Division. Additional assistance, both in maintenance and operation, is available in the form of technical representatives from the Office of the Chief Signal Officer.

Potent Force of TV Instruction

Now, to identify some of the basic reasons for developing an organization of this magnitude: First of all, it represents an

implementation of the conviction that television is an effective and potent force in support of the training and education mission of the Army Medical Service. This conclusion was reached after substantial deliberation by several committees of qualified experts representing all of the interested agencies defined with the above responsibility. Not the least significant factor in their decision was the demonstrated effectiveness of the medium of television as it was explored by the Television Section of the Medical Audio-Visual Department of the Walter Reed Army Institute of Research. Further, an analysis of nongovernmental experiences with the medium suggests that limited though its application has been, its potential is very real. It has been ascertained that television has an almost hypnotic attention-focusing characteristic as it has been observed in the commercial broadcast field, and a similar effect has seemed to characterize its application in the training and educational area. Indeed, the documented studies which exist suggest that the television medium has the potential for information transmission essentially equal to that of a live instructor before a class.

Even a kine-recording seems to retain a large percentage of this effectiveness. Some studies suggest that the use of live television modified to take advantage of its several unique characteristics has in fact a larger effectiveness in information transmission than that inherent in the live in-

structor before a class. Such things as the use of close-ups and the incorporation of high-quality forceful programming into the presentation should be pointed out.

Economics of TV Teaching

It would probably be meaningless to outline in detail the advantages the use of such an effective medium would have to those charged with major training and educational responsibilities within the Army Medical Service. Perhaps one example will suffice: The present course for instruction concerning the care of mass casualties has now been presented for approximately three years. Rarely has it been effectively displayed before an audience exceeding 100 persons, and this at very substantial cost when one considers dislocation from normal duty, the cost of per diem—the cost of transportation of faculty, and even then many of the participants have had a remote, back-row seat.

Utilizing the medium of television, a similar or perhaps even better program can be presented simultaneously to an essentially unlimited audience of physicians, nurses, dentists, veterinarians, semiprofessional medical personnel, and the laity—and this at a very small per-student cost.

Unique Advantages of TV

To go to another extreme, television makes possible the viewing by large numbers of phenomena which either can at best be viewed by only a limited few, or

perchance cannot be seen at all directly by the human eye either due to extreme personal hazard or some other limiting factor. The television camera can be regarded essentially as a projection of one's ability to see, and this projection is unlimited by such matters as time and space.

Actually one is able to create an almost ideal one-to-one student-teacher relationship for an unlimited number of people, widely dispersed over an unlimited geographic area and, through the medium of recording, without the limitation of time. These, then, are some of the factors basic to the decision for implementing a major television activity in support of those many areas in the Army Medical Service wherein the projection of information represents a vital requirement, this certainly existing in many of the training, educational, research, informational, service and administrative programs of the Army Medical Service.

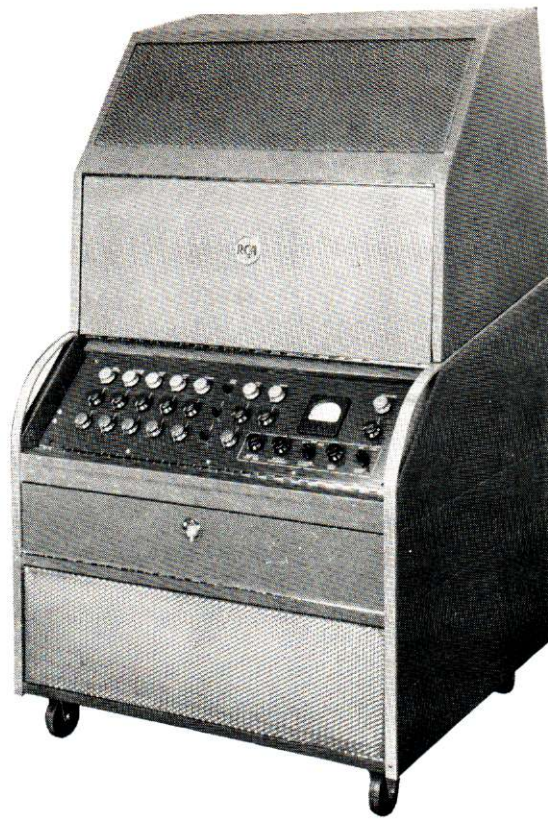
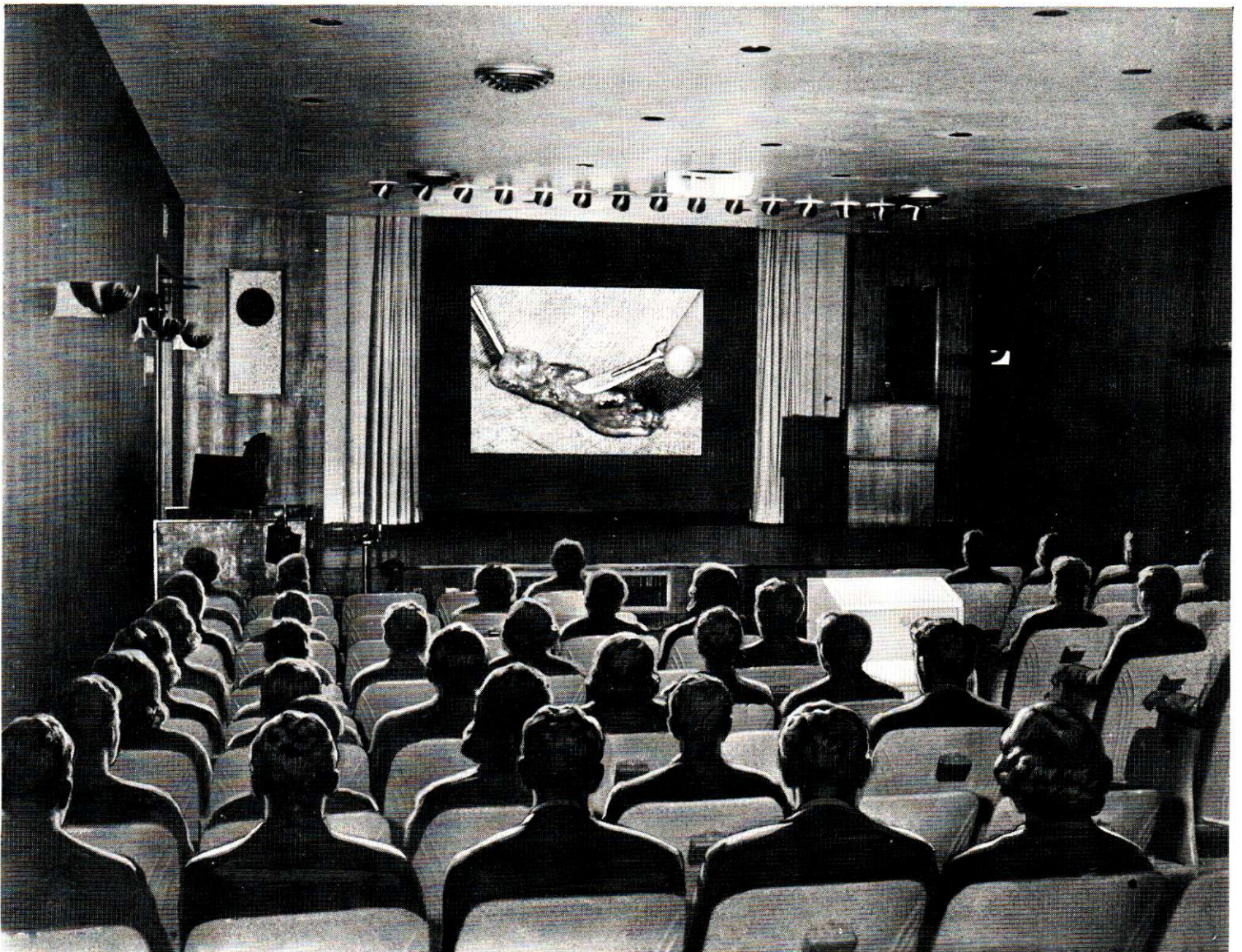
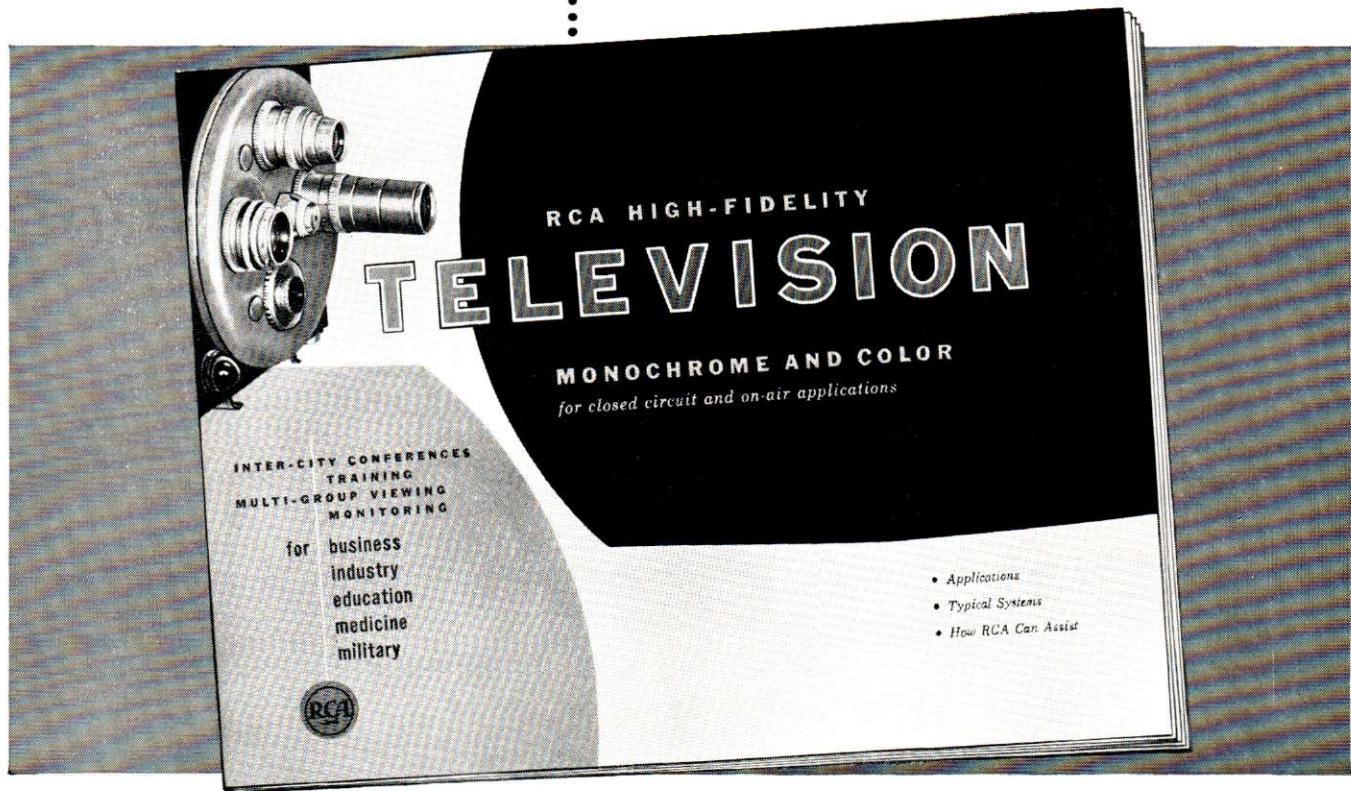


FIG. 20. RCA color TV picture projector is used in auditorium and large classrooms. This presents a picture in full color in size suitable for an audience of several hundred persons. Note typical use in auditorium shown in illustration below.



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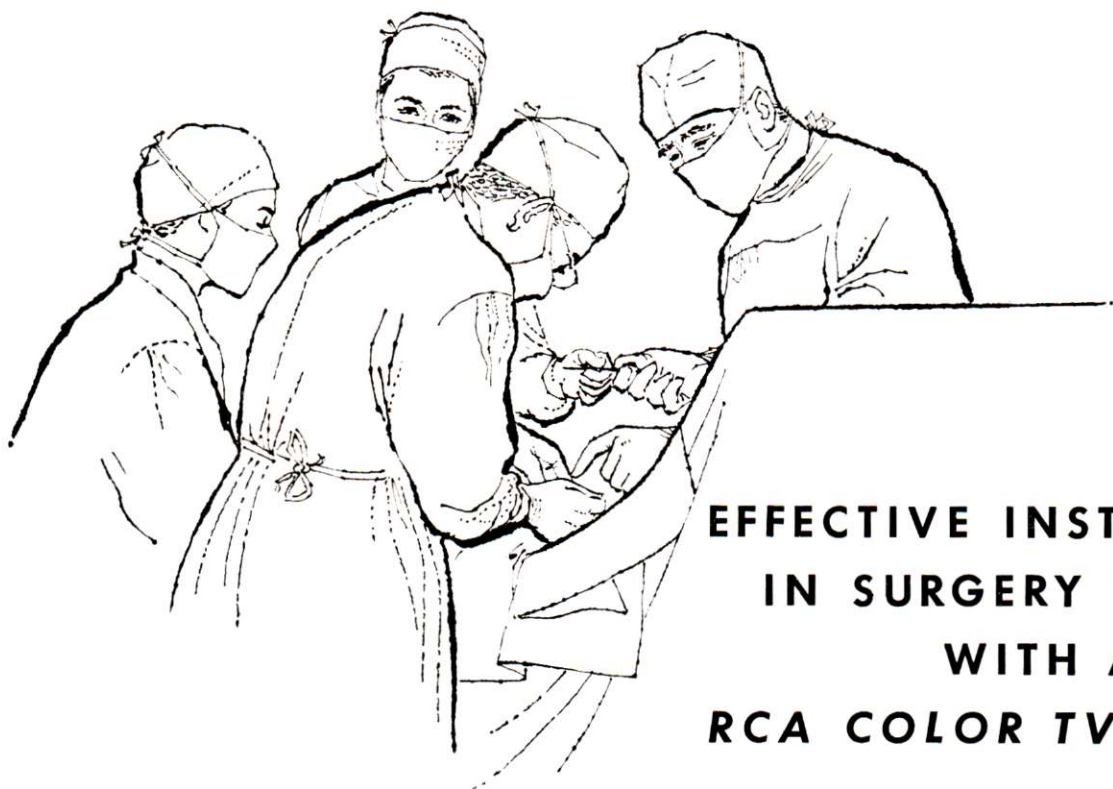
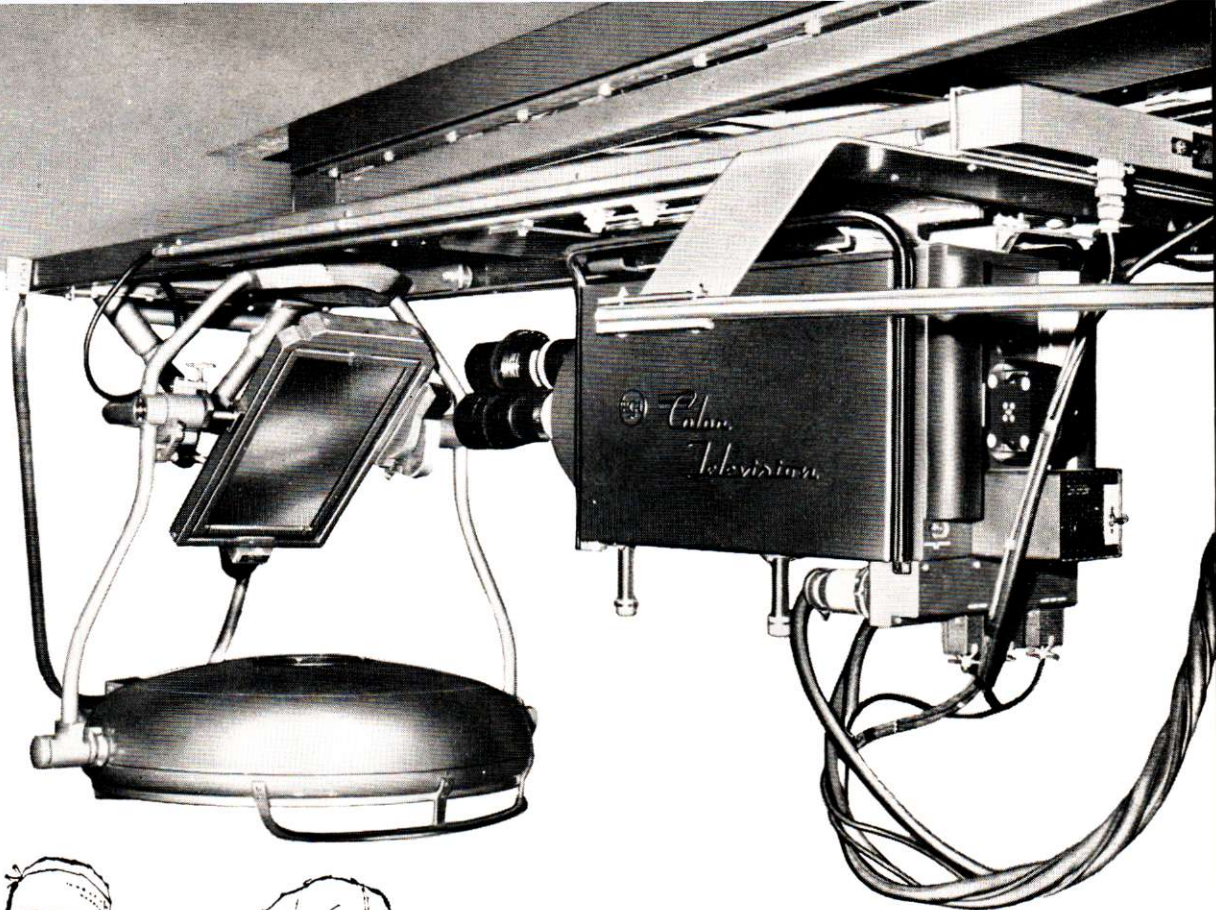
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WITH AN
RCA COLOR TV CAMERA**

The RCA medical color TV camera illustrated here is especially designed for televising close-up views of surgical procedures. A special mounting fixture allows the camera to be suspended above the operating table. A specially designed surgical lamp illuminates the operating area, and the camera views this area through an opening in the lamp fixture via a built-in mirror. These close-up pictures are sent over a closed-circuit hookup to any number of television screens where hundreds of students may see them.

Other cameras and related equipments are available for many applications in medical instruction—for demonstrating clinical procedures, for large screen presentation of microscopic specimens, etc.

*For literature and further information on the use of television in medical instruction,
write Dept. MTV, Radio Corporation of America, Building 15-1, Camden, N. J.*



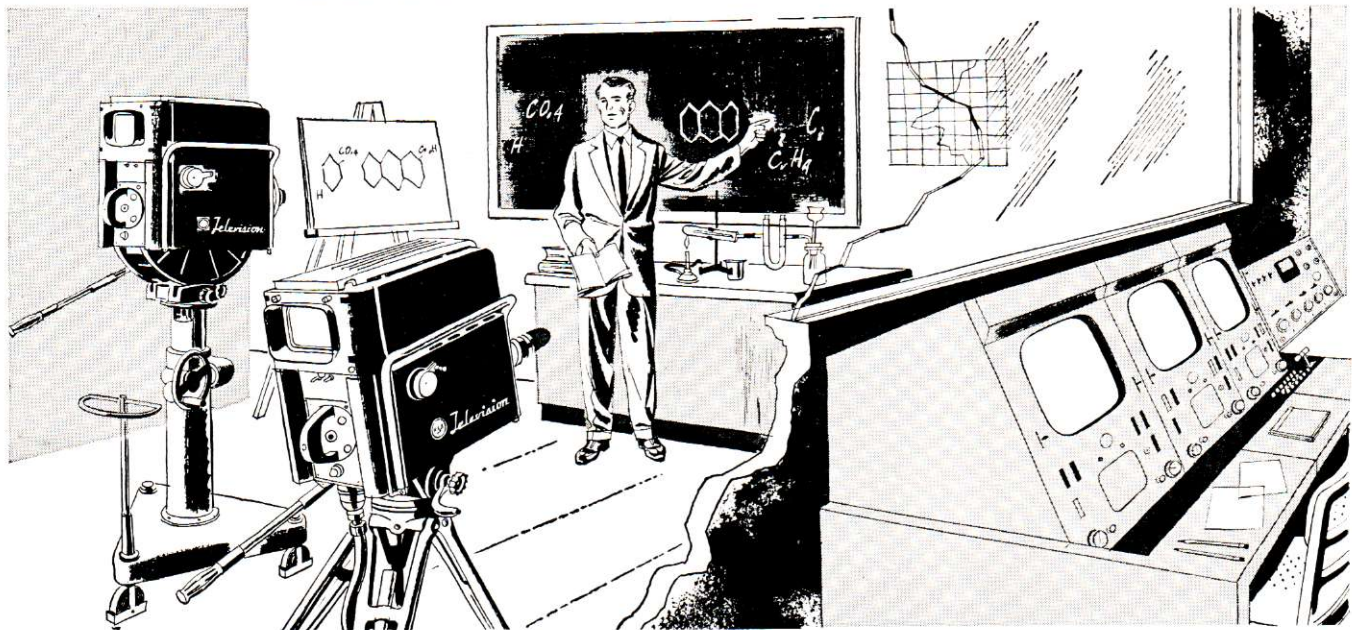
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A basic high-fidelity television teaching studio, with associated control room, is illustrated. Studio is equipped with two cameras and microphones. The use of two cameras facilitates a variety of picture material—close ups, long shots, visual aids, settings. Switching from camera to

camera provides a change of pace to spark program interest and promote fullest attention from students. Control room is equipped with video and audio controls and switching facilities. This equipment can be readily expanded, as your plans develop and your goals increase, giving you needed supplementary facilities and protecting your investment far into the future.

For instruction in medicine and surgery, where live demonstrations via color television offer opportunity for highest realism, system-integrated color cameras will be preferred. A special overhead color camera has been developed to provide a "surgeon's eye view" of operations to any number of students.

For an informative brochure on RCA High Fidelity Television Systems, write to Educational Administrator, Television Equipment, Dept. MTV, Radio Corporation of America, Building 15-1, Camden, N. J.

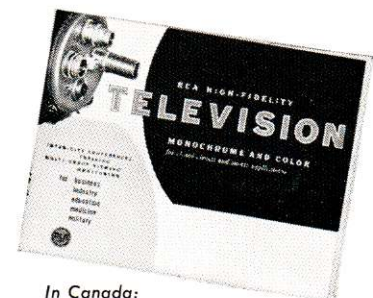


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